

Modeling the Impacts of Sea-Level Rise

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The Sea Level Affecting Marshes Model (SLAMM) was first developed almost 18 years ago to assess the impacts of accelerated sea-level rise due to global warming. The original model was based on manually coded data on elevation and cover classes from topographic maps, using a one-km² grid. For the EPA Report to Congress on Climate Change (1989), SLAMM 2 used remotely sensed data, manually digitized elevation data, and more refined modeling procedures to obtain estimates of vulnerability for coastal wetlands and lowlands for 20% of the nation's contiguous coastline; ten years after publication the results were quoted by President Clinton. More recently case studies were conducted for Puget Sound and all of southern Florida using SLAMM 3. The most recent version, SLAMM 4, can combine NOAA, USGS, and F&WS data available on the Internet to model coastal areas on a 30-m grid—providing high-resolution maps with sufficient detail to assess habitat loss and to facilitate visualization of impacts by decision makers. The model has proven useful in forecasting wetland loss under various sea-level rise scenarios, and in predicting impacts on shrimp fisheries and migratory bird populations. With the advent of high vertical-resolution digital elevation data and better estimates of the areal extent of seagrass, further enhancements and applications are possible.